C. BOSSE.

SUGAR CANE MILL.

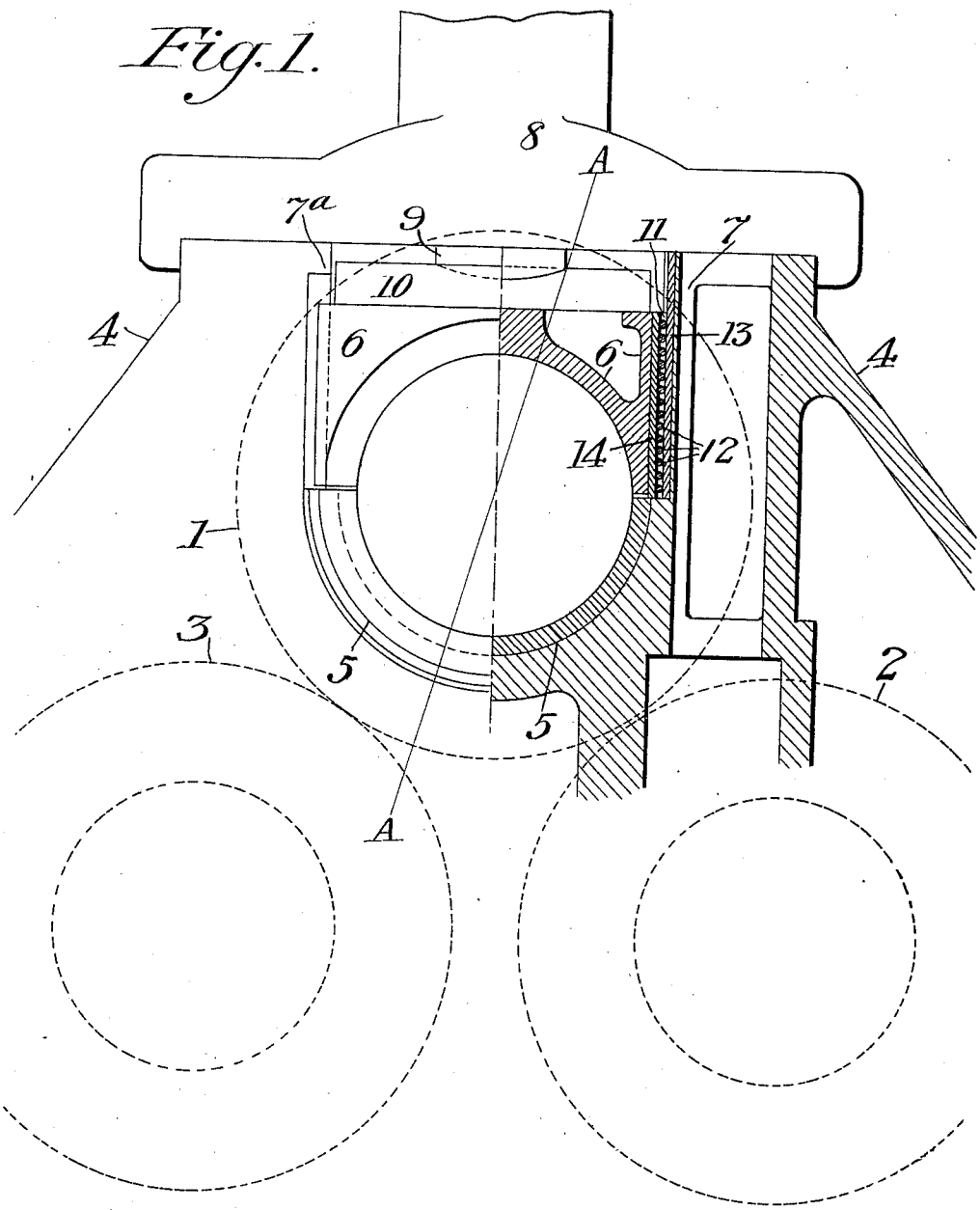
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1,083,983.

Patented Jan. 13, 1914.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses.

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2 SHEETS—SHEET 2.

Fig. 2.

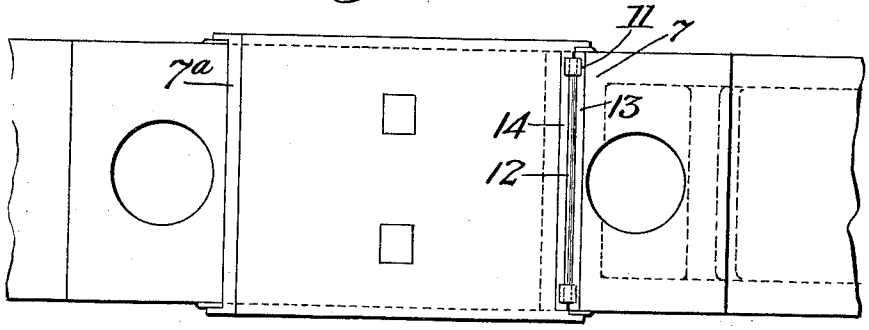


Fig. 4.

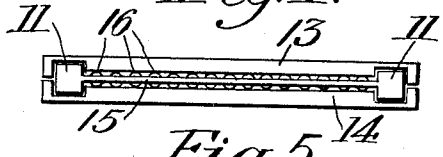


Fig. 3.

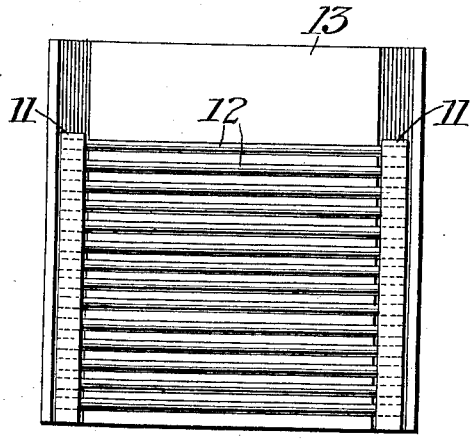
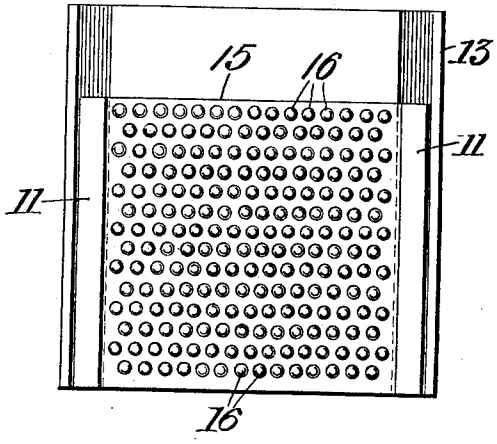


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHRISTIAN BOSSE, OF WAIPAHU, TERRITORY OF HAWAII.

SUGAR-CANE MILL.

1,083,983. Specification of Letters Patent. Patented Jan. 13, 1914.

Application filed December 2, 1912. Serial No. 734,517.

To all whom it may concern:

Be it known that I, CHRISTIAN BOSSE, a citizen of the United States, residing at Waipahu, county of Honolulu, Territory of Hawaii, have invented certain new and useful Improvements in Sugar-Cane Mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in sugar-cane mills, and particularly to mills of this character having hydraulic or fluid pressure applied to its top roller.

In sugar-cane mills having three rollers with their axes in triangular arrangement, the cane first enters and passes between the top roll and the front lower or feed roll, then over the returner-bar, and then between the top roll and the rear lower or discharge roll, from which the crushed cane is discharged. These rolls are set with the opening between the top roll and the feed roll greater than the opening between the top roll and the discharge roll, so that the crushing strain upon the cane is always greater in the latter case, that is to say, the force exerted to separate the top and discharge rolls always exceeds that exerted between the top and feed rolls. The resultant of these forces which tend to lift the top roll is therefore, not in a vertical plane but in an inclined plane. This produces a lateral thrust and causes the pressure of the top bearing brass of each of the journals of the top roller against the jaw of the housing to be greater on the feed side than on the discharge side.

The object of this invention is to provide means for reducing the friction, produced by the lateral thrust above mentioned, between the jaw of the housing and the moving top bearing brass, such that the top roller may not as heretofore be either prevented or at least handicapped from moving vertically with or against the action of the hydraulics.

A further object is to make the invention applicable to existing as well as to new sugar-cane mills.

To these ends, the invention contemplates the introduction of a system of roller or ball bearings suitably interposed between the top bearing brass and the vertical wall of the jaw on the feed side of each housing.

The invention consists in the novel construction, combination and arrangement of parts hereinafter described and claimed, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents in side elevation and partly in section a portion of a sugar-cane mill embodying my invention. Fig. 2 represents in plan view the housing and anti-friction device shown in Fig. 1, the bearing brasses being removed. Fig. 3 represents in elevation the anti-friction device shown in plan in Fig. 2. Fig. 4 represents in plan a modification in which balls are used instead of rollers. Fig. 5 is an elevation of the modification shown in Fig. 4 with the front plate removed.

Referring to the drawings, 1 represents the top roll, 2 the front lower or feed roll, and 3 the rear lower or discharge roll of a three roller mill, Fig. 1. The housing 4 is shown provided with the lower bearing 5 for the journal of the top roller, and with the upper top roller journal bearing brass 6 adapted to slide vertically with the movement of the top roll 1 between the walls or jaws 7 and 7ª of the housing 4. The top cap 8 is shown with the plunger 9 of the hydraulic jack engaging the bearing block 10 which distributes the pressure upon the upper bearing brass 6. However, as far as the present invention is concerned, it is immaterial how the hydraulic pressure is applied to the upper bearing brass, for the invention is applicable to other types of mills, for example, to the older type in which the jacks are placed below the mill bed and the pressure is transmitted through the king bolts and the top cap moves with the upper bearing brass.

The top roll 1 and discharge roll 3 are always set closer together than the top roll 1 and the feed roll 2, so that the force exerted to separate the former always exceeds that exerted to separate the latter rolls. The resultant of these forces may be represented by the line A—A shown in Fig. 1. This resultant is inclined to the vertical, and when resolved into its horizontal and vertical components, it will be noted that there is a considerable lateral thrust which forces the top bearing brass toward the jaw of the housing on the feed side. This lateral thrust is so great that the friction between the brass and the jaw often prevents or at least handi-

caps the vertical movement of the brass. To reduce this friction to a minimum I employ the following device.

The bars 11, preferably of a square or rectangular cross section, are each provided with a plurality of holes, in each of which one end of a small round bar or roller 12 is loosely journaled, Figs. 2 and 3. These rollers 12 are interposed between the plate 13 bearing against the jaw 7 and the plate 14 bearing against the top brass 6 respectively, Figs. 1 and 2. Suitable vertical grooves are cut in these plates to admit the bars 11 and permit said bars to move freely vertically. The bars 12 and plates 13 and 14 are preferably made of steel and hardened to resist wear. It will now be noted, that the lateral pressure of the brass 6 is taken successively by the plate 14, the rollers 12, the plate 13 and the jaw 7; that the plate 14 will move vertically with the brass 6, as the friction between the plate 14 and the brass 6 is greater than that between the plate 14 and the rollers 12; and that by the arrangement described the friction between the top bearing brass and the jaw of the housing is thereby greatly reduced, permitting said brass to move freely with the movement of the top roller.

In the modification shown in Figs. 4 and 5, the rollers 12 are omitted and a plate 15 is secured to the two vertical bars 11. This plate 15 is provided with a plurality of holes in each of which is a hardened steel ball 16, the plate 15 thus being a retainer for the balls 16 which are interposed between and which roll on the plates 13 and 14.

I am aware that ball and roller bearings are not new, but

What I claim is—

1. In a sugar-cane mill, the combination with the upper bearing of the top roller and the housing, of means interposed between said upper bearing and the vertical jaw of said housing to facilitate the vertical movement of said bearing.

2. In a sugar-cane mill, the combination with the upper bearing of the top roller and the housing, of a plurality of rollers interposed between said upper bearing and the vertical jaw of said housing, for the purpose specified.

3. In a sugar-cane mill, the combination with the upper bearing of the top roller and the housing, of two hardened plates interposed between said upper bearing and the vertical jaw of said housing, and a plurality of substantially horizontal rollers between said plates, for the purpose specified.

4. In a sugar-cane mill, the combination with the upper bearing of the top roller and the housing, of a roller carrying frame disposed between said upper bearing and the vertical jaw of said housing, and rollers loosely mounted in said frame, said rollers adapted to facilitate the vertical movement of said bearing.

5. In a sugar-cane mill, the combination with the upper bearing of the top roller and the housing, of means interposed between the said upper bearing and the vertical wall of the housing on the feed side of the mill to take the lateral thrust caused by the discharge roll and thereby facilitate the vertical movement of said bearing.

In testimony whereof I affix my signature, in presence of two witnesses.

CHRISTIAN BOSSE.

Witnesses:
ROBT. J. PRATT,
GUST. NICOLAI.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."